**Article 11. Surface Impoundments**

**§66264.220. Applicability.**

The regulations in this article apply to owners and operators of facilities that use surface impoundments to treat, store, or dispose of hazardous waste except as section 66264.1 of this chapter provides otherwise.

NOTE: Authority cited: Sections 208, 25150 and 25159, Health and Safety Code. Reference: Sections 25150, 25159 and 25159.5, Health and Safety Code; 40 CFR Section 264.220.

HISTORY

1. New section filed 5-24-91; operative 7-1-91 (Register 91, No. 22).

**§66264.221. Design and Operating Requirements.**

(a) Any surface impoundment that is not covered by subsection (c) of this section or section 66265.221 shall have a liner for all portions of the impoundment (except for existing portions of such impoundments). The liner shall be designed, constructed, and installed to prevent any migration of wastes out of the impoundment to the adjacent subsurface soil or ground water or surface water at any time during the active life (including the closure period) of the impoundment. The liner may be constructed of materials that may allow wastes to migrate into the liner (but not into the adjacent subsurface soil or ground water or surface water) during the active life of the facility, provided that the impoundment is closed in accordance with section 66264.228(a)(1). For impoundments that will be closed in accordance with section 66264.228(a)(2), the liner shall be constructed of materials that can prevent wastes from migrating into the liner during the active life of the facility. The liner shall be:

(1) constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to pressure gradients (including static head and external hydrogeologic forces), physical contact with the waste or leachate to which they are exposed, climatic conditions, the stress of installation, and the stress of daily operation;

(2) placed upon a foundation or base capable of providing support to the liner and resistance to pressure gradients above and below the liner to prevent failure of the liner due to settlement, compression, or uplift; and

(3) installed to cover all surrounding earth likely to be in contact with the waste or leachate.

(b) The owner or operator will be exempted from the requirements of subsection (a) of this section if the Department finds, based on a demonstration by the owner or operator, that alternate design and operating practices, together with location characteristics, will prevent the migration of any hazardous constituents into soil outside the impoundment or into the ground water or surface water at any future time. In deciding whether to grant an exemption, the Department will consider:

(1) the nature and quantity of the wastes;

(2) the proposed alternate design and operation;

(3) the hydrogeologic setting of the facility, including the alternative capacity and thickness of the liners and soils present between the impoundment and ground water or surface water; and

(4) all other factors which would influence the quality and mobility of the leachate produced and the potential for it to migrate to ground water or surface water;

(5) the potential for lateral migration of hazardous constituents which could present a threat to public health or the environment;

(6) recommendations of the State Water Resources Control Board or the appropriate Regional Water Quality Control Board.

(c) The owner or operator of each new surface impoundment unit on which construction commences after January 29, 1992, each lateral expansion of a surface impoundment unit on which construction commences after July 29, 1992 and each replacement of an existing surface impoundment unit that is to commence reuse after July 29, 1992 shall install two or more liners and a leachate collection and removal system between such liners. “Construction commences” is as defined in section 66260.10 of this chapter under “existing facility”. When an existing surface impoundment is expanded after January 29, 1992, the entire surface impoundment will be treated as a surface impoundment constructed after January 29, 1992. The requirements of this subsection shall not apply to surface impoundment units receiving only non-RCRA hazardous waste until February 18, 1996.

(1)(A) The liner system shall include:

1. A top liner designed and constructed of materials (e.g., a geomembrane) to prevent the migration of hazardous constituents into such liner during the active life and post-closure care period; and

2. A composite bottom liner, consisting of at least two components. The upper component shall be designed and constructed of materials (e.g., a geomembrane) to prevent the migration of hazardous constituents into this component during the active life and post-closure care period. The lower component shall be designed and constructed of materials to minimize the migration of hazardous constituents if a breach in the upper component were to occur. The lower component shall be constructed of at least 3 feet (91 cm) of compacted soil material with a hydraulic conductivity of no more than 1x10-7 cm/sec.

(B) The liners shall comply with subsections (a)(1), (2), and (3) of this section.

(2) The leachate collection and removal system between the liners, and immediately above the bottom composite liner in the case of multiple leachate collection and removal systems, is also a leak detection system. This leak detection system shall be capable of detecting, collecting, and removing leaks of hazardous constituents at the earliest practicable time through all areas of the top liner likely to be exposed to waste or leachate during the active life and post-closure care period. The requirements for a leak detection system in this subsection are satisfied by

  

installation of a system that is, at a minimum:

(A) Constructed with a bottom slope of one percent or more;

(B) Constructed of granular drainage materials with a hydraulic conductivity of 1x10-1 cm/sec or more and a thickness of 1 foot (30.5 cm) or more; or constructed of synthetic or geonet drainage materials with a transmissivity of 3x10-4 m2/sec or more. In cases where the leak detection system is composed of coarse granular material, there shall be a suitable interface (e.g., geotextile) between the leak detection system and any flexible membrane liner, as needed to prevent the coarse grains from causing a puncture in the flexible membrane liner under the high stress conditions caused by the overlying waste;

(C) Constructed of materials that are chemically resistant to the waste managed in the surface impoundment and the leachate expected to be generated, and of sufficient strength and thickness to prevent collapse under the pressures exerted by overlying wastes and any waste cover materials or equipment used at the surface impoundment;

(D) Designed and operated to minimize clogging during the active life and post-closure care period; and

(E) Constructed with sumps and liquid removal methods (e.g., pumps) of sufficient size to collect and remove liquids from the sump and prevent liquids from backing up into the drainage layer. Each unit shall have its own sump(s). The design of each sump and removal system shall provide a method for measuring and recording the volume of liquids present in the sump and of liquids removed.

(3) The owner or operator shall collect and remove pumpable liquids in the sumps to minimize the head on the bottom liner.

(4) The liner system shall be designed, constructed and operated to ensure that leak detection system shall be a minimum of 5 feet above the highest anticipated elevation of groundwater.

(d) The liners shall be designed and constructed to contain the waste and leachate fluids when subjected to the maximum anticipated hydraulic head which will be imposed during disposal operations and the post-closure maintenance period.

(e) The leachate collection and removal system shall:

(1) be designed, constructed, maintained and operated to collect leachate from the area, and to ensure that there is no buildup of hydraulic head on the liner. The depth of fluid in the collection sump shall be kept at a minimum needed to ensure sufficient pump operation;

(f) The Department may approve alternative design or operating practices to those specified in subsection (c) of this section if the owner or operator demonstrates to the Department that such design and operating practices, together with location characteristics:

(1) Will prevent the migration of any hazardous constituent into the groundwater or surface water at least as effectively as the liners and leachate collection and removal system specified in subsection (c) of this section; and

(2) Will allow detection of leaks of hazardous constituents through the top liner at least as effectively.

(g) The double liner requirement set forth in subsection (c) of this section shall be waived by the Department for any monofill, if:

(1) the monofill contains only hazardous wastes from foundry furnace emission controls or metal casting molding sand, and such wastes do not contain constituents which would render the wastes hazardous for reasons other than exceeding the soluble threshold limit concentration as described in section 66261.24; and

(2)(A) 1. the monofill has at least one liner for which there is no evidence that such liner is leaking. For the purposes of this subsection, the term “liner” means a liner designed, constructed, installed, and operated to prevent hazardous waste from passing into the liner at any time during the active life of the facility, or a liner designed, constructed, installed, and operated to prevent hazardous waste from migrating beyond the liner to adjacent subsurface soil, ground water, or surface water at any time during the active life of the facility. In the case of any surface impoundment which has been exempted from the requirements of subsection (c) of this section on the basis of a liner designed, constructed, installed, and operated to prevent hazardous waste from passing beyond the liner, at the closure of such impoundment, the owner or operator shall remove or decontaminate all waste residues, all contaminated liner material, and contaminated soil to the extent practicable. If all contaminated soil is not removed or decontaminated, the owner or operator of such impoundment will comply with appropriate post-closure requirements, including but not limited to groundwater monitoring and corrective action;

2. the monofill is located more than one-quarter mile from an underground source of drinking water as defined in section 66260.10 of this chapter; and

3. the monofill is in compliance with generally applicable groundwater monitoring requirements for facilities with permits; or the owner or operator demonstrates that the monofill is located, designed and operated so as to assure that there will be no migration of any hazardous constituent into ground water or surface water at any future time.

(h) A surface impoundment shall be designed, constructed, maintained, and operated to prevent overtopping resulting from normal or abnormal operations; overfilling; wind and wave action; rainfall; run-on; malfunctions of level controllers, alarms, and other equipment; and human error.

(i) A surface impoundment shall have dikes that are designed, constructed, and maintained with sufficient structural integrity to prevent massive failure of the dikes. In ensuring structural integrity, it must not be presumed that the liner system will function without leakage during the active life of the unit.

(j) The Department will specify in the permit all design and operating practices that are necessary to ensure that the requirements of this section are satisfied.

(k) The owner or operator of any replacement surface impoundment unit is exempt from subsection (c) of this section if:

 

(1) The existing unit was constructed in compliance with the design standards of 42 USC section 6924(o)(1)(A)(i) and 42 USC section 6924(o)(5); and

(2) There is reason to believe that the liner is functioning as designed.

NOTE: Authority cited: Sections 25150 and 25159, Health and Safety Code; and Governor's Reorganization Plan Number 1 of 1991. Reference: Sections 25159 and 25159.5, Health and Safety Code; and 40 CFR 40 section 264.221.

HISTORY

1. New section filed 5-24-91; operative 7-1-91 (Register 91, No. 22).
2. Amendment of section and Note filed 7-19-95; operative 8-18-95 (Register 95, No. 29).
3. Change without regulatory effect amending subsections (c), (f)(1) and (k)(1) filed 6-30-97 pursuant to section 100, title 1, California Code of Regulations (Register 97, No. 27).
4. Change without regulatory effect amending subsections (c) and (c)(4) filed 10-21-97 pursuant to section 100, title 1, California Code of Regulations (Register 97, No. 43).

**§66264.222. Action Leakage Rate.**

(a) The Department shall approve an action leakage rate for surface impoundment units subject to section 66264.221 (c) or (f). The action leakage rate is the maximum design flow rate that the leak detection system (LDS) can remove without the fluid pressure head on the bottom liner exceeding 1 foot (30.5 cm) at any given portion of the liner. The action leakage rate shall include an adequate safety margin to allow for uncertainties in the design (e.g., slope, hydraulic conductivity, thickness of drainage material), construction, operation, and location of the LDS, waste and leachate characteristics, likelihood and amounts of other sources of liquids in the LDS, and proposed response actions (e.g., the action leakage rate shall consider decreases in the flow capacity of the system over time resulting from siltation and clogging, rib layover and creep of synthetic components of the system, overburden pressures, etc.).

(b) To determine if the action leakage rate has been exceeded, the owner or operator shall convert the weekly or monthly flow rate from the monitoring data obtained under section 66264.226(d) to an average daily flow rate (gallons per acre per day) for each sump. Unless the Department approves a different calculation, the average daily flow rate for each sump shall be calculated weekly during the active life and closure period, and if the unit is closed in accordance with section 66264.228(b), monthly during the post-closure care period when monthly monitoring is required under section 66264.226(d).

NOTE: Authority cited: Sections 25150 and 25159, Health and Safety Code; and Governor's Reorganization Plan Number 1 of 1991. Reference: Sections 25159 and 25159.5, Health and Safety Code; and 40 CFR Section 264.222.

HISTORY

1. New section filed 7-19-95; operative 8-18-95 (Register 95, No. 29).
2. Change without regulatory effect amending subsection (a) filed 6-30-97 pursuant to section 100, title 1, California Code of Regulations (Register 97, No. 27).

**§66264.223. Response Actions.**

(a) The owner or operator of surface impoundment units subject to section 66264.221(c) or (f) shall have an approved response action plan before receipt of waste. The response action plan shall set forth the actions to be taken if the action leakage rate has been exceeded. At a minimum, the response action plan shall describe the actions specified in subsection (b) of this section.

(b) If the flow rate into the leak detection system exceeds the action leakage rate for any sump, the owner or operator shall:

(1) Notify the Department in writing of the exceedence within 7 days of the determination;

(2) Submit a preliminary written assessment to the Department within 14 days of the determination, as to the amount of liquids, likely sources of liquids, possible location, size, and cause of any leaks, and short-term actions taken and planned;

(3) Determine to the extent practicable the location size, and cause of any leak;

(4) Determine whether waste receipt should cease or be curtailed, whether any waste should be removed from the unit for inspection, repairs, or controls, and whether or not the unit should be closed;

(5) Determine any other short-term and longer-term actions to be taken to mitigate or stop any leaks; and

(6) Within 30 days after the notification that the action leakage rate has been exceeded, submit to the Department the results of the analyses specified in subsections (b)(3), (4) and (5) of this section, the results of actions taken, and actions planned. Monthly thereafter, as long as the flow rate in the leak detection system exceeds the action leakage rate, the owner or operator shall submit to the Department a report summarizing the results of any remedial actions taken and actions planned.

(c) To make the leak and/or remediation determinations in subsections (b)(3), (4) and (5) of this section, the owner or operator shall:

(1)(A) Assess the source of liquids and amounts of liquids by source,

(B) Conduct a fingerprint, hazardous constituent, or other analyses of the liquids in the leak detection system to identify the source of liquids and possible location of any leaks, and the hazard and mobility of the liquid; and

(C) Assess the seriousness of any leaks in terms of potential for escaping into the environment; or

(2) Document why such assessments are not needed.

  

NOTE: Authority cited: Sections 25150 and 25159, Health and Safety Code; and Governor's Reorganization Plan Number 1 of 1991. Reference: Sections 25159 and 25159.5, Health and Safety Code; and 40 CFR Section 264.223.

HISTORY

1. New section filed 7-19-95; operative 8-18-95 (Register 95, No. 29).

**§66264.226. Monitoring and Inspection.**

(a) During construction and installation, liners (except in the case of existing portions of surface impoundments exempt from section 66264.221(a)) and cover systems (e.g., membranes, sheets, or coatings) shall be inspected for uniformity, damage, and imperfections (e.g., holes, cracks, thin spots, or foreign materials). Immediately after construction or installation:

(1) synthetic liners and covers shall be inspected to ensure tight seams and joints and the absence of tears, punctures, or blisters; and

(2) soil-based and admixed liners and covers shall be inspected for imperfections including lenses, cracks, channels, root holes, or other structural non-uniformities that may cause an increase in the permeability of the liner or cover.

(b) While a surface impoundment is in operation, it shall be inspected weekly and after storms to detect evidence of any of the following:

(1) deterioration, malfunctions, or improper operation of overtopping control systems;

(2) sudden drops in the level of the impoundment's contents; and

(3) the presence of liquids in leak detection systems;

(4) severe erosion or other signs of deterioration in dikes or other containment devices.

(c) Prior to the issuance of a permit, and after any extended period of time (at least six months) during which the impoundment was not in service, the owner or operator shall obtain a certification from a qualified engineer, registered in California, that the impoundment's dike, including that portion of any dike which provides freeboard, has structural integrity. The certification must establish, in particular, that the dike:

(1) will withstand the stress of the pressure exerted by the types and amounts of wastes to be placed in the impoundment;

(2) will not fail due to scouring or piping, without dependence on any liner system included in the surface impoundment construction;

(3) will not fail due to external or internal forces from a maximum credible earthquake or landslide.

(d)(1) An owner or operator required to have a leak detection system under section 66264.221(c) or (f) shall record the amount of liquids removed from each leak detection system sump at least once each week during the active life and closure period.

(2) After the final cover is installed, the amount of liquids removed from each leak detection system sump shall be recorded at least monthly. If the liquid level in the sump stays below the pump operating level for two consecutive months, the amount of liquids in the sumps shall be recorded at least quarterly. If the liquid level in the sump stays below the pump operating level for two consecutive quarters, the amount of liquids in the sumps shall be recorded at least semi-annually. If at any time during the post-closure care period the pump operating level is exceeded at units on quarterly or semi-annual recording schedules, the owner or operator shall return to monthly recording of amounts of liquids removed from each sump until the liquid level again stays below the pump operating level for two consecutive months.

(3) “Pump operating level” is a liquid level proposed by the owner or operator and approved by the Department based on pump activation level, sump dimensions, and level that avoids backup into drainage layer and minimizes head in the sump.

NOTE: Authority cited: Sections 25150 and 25159, Health and Safety Code; and Governor's Reorganization Plan Number 1 of 1991. Reference: Sections 25150, 25159 and 25159.5, Health and Safety Code; and 40 CFR Section 264.226.

HISTORY

1. New section filed 5-24-91; operative 7-1-91 (Register 91, No. 22).
2. New subsections (d)(1)-(3) and amendment of Note filed 7-19-95; operative 8-18-95 (Register 95, No. 29).

**§66264.227. Emergency Repairs; Contingency Plans.**

(a) A surface impoundment shall be removed from service in accordance with subsection (b) of this section when:

(1) the level of liquids in the impoundment suddenly drops and the drop is not known to be caused by changes in the flows into or out of the impoundment; or

(2) the dike leaks.

(b) When a surface impoundment must be removed from service as required by subsection (a) of this section, the owner or operator shall:

(1) immediately shut off the flow or stop the addition of wastes into the impoundment;

(2) immediately contain any surface leakage which has occurred or is occurring;

(3) immediately stop the leak;

(4) take any other necessary steps to stop or prevent catastrophic failure;

(5) if a leak cannot be stopped by any other means, empty the impoundment; and

(6) notify the Department of the problem in writing within seven days after detecting the problem.

  

(c) As part of the contingency plan required in article 4 of this chapter, the owner or operator shall specify a procedure for complying with the requirements of subsection (b) of this section.

(d) No surface impoundment that has been removed from service in accordance with the requirements of this section may be restored to service unless the portion of the impoundment which was failing is repaired and the following steps are taken.

(1) If the impoundment was removed from service as the result of actual or imminent dike failure, the dike's structural integrity must be recertified in accordance with section 66264.226(c).

(2) If the impoundment was removed from service as the result of a sudden drop in the liquid level, then:

(A) for any existing portion of the impoundment, a liner shall be installed in compliance with section 66264.221(a); and

(B) for any other portion of the impoundment, the repaired liner system shall be certified by a qualified engineer, registered in California, as meeting the design specifications approved in the permit.

(e) A surface impoundment that has been removed from service in accordance with the requirements of this section and that is not being repaired shall be closed in accordance with the provisions of section 66264.228.

NOTE: Authority cited: Sections 208, 25150 and 25159, Health and Safety Code. Reference: Sections 25150, 25159 and 25159.5, Health and Safety Code; 40 CFR Section 264.227.

HISTORY

1. New section filed 5-24-91; operative 7-1-91 (Register 91, No. 22).

**§66264.228. Closure and Postclosure Care.**

(a) At closure, the owner or operator shall:

(1) remove or decontaminate all waste residues, contaminated containment system components (liners, etc.), contaminated subsoils, and structures and equipment contaminated with waste and leachate, and manage them as hazardous waste unless section 66261.3(d) applies; or

(2)(A) eliminate free liquids by removing liquid wastes or solidifying the remaining wastes and waste residues;

(B) stabilize remaining wastes to a bearing capacity sufficient to support final cover; and

(C) cover the surface impoundment with a final cover designed and constructed to:

1. prevent the downward entry of water into the closed impoundment throughout a period of at least 100 years;

2. function with minimum maintenance;

3. promote drainage and minimize erosion or abrasion of the final cover;

4. accommodate settling and subsidence so that the cover's integrity is maintained; and

5. have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present;

6. accommodate lateral and vertical shear forces generated by the maximum credible earthquake so that the integrity of the cover is maintained;

7. preclude ponding of rainfall and surface run-on over the closed area.

(b) If some waste residues, contaminated materials or contaminated soils are left in place at final closure, the owner or operator shall comply with all postclosure requirements contained in sections 66264.117 through 66264.120, including maintenance and monitoring throughout the postclosure care period (specified in the permit under section 66264.117). The owner or operator shall:

(1) close the facility in a manner that will minimize any chance of postclosure release of hazardous waste or discarded hazardous material; facilitate postclosure maintenance, monitoring and emergency response; and require minimum maintenance of containment structures, leachate collection systems and surface drainage collection or diversion systems;

(2) maintain the integrity and effectiveness of the final cover, including making repairs to the cap as necessary to correct the effects of settling, subsidence, erosion or other events;

(3) maintain and monitor the leachate collection and removal system which also serves as a leak detection system;

(4) maintain and monitor the groundwater monitoring system and comply with all other applicable requirements of article 6 of this chapter;

(5) prevent run-on and run-off from eroding or otherwise damaging the final cover, and

(6) Maintain and monitor the leak detection system in accordance with sections 66264.221(c)(2)(D) and (c)(3) and 66264.226(d), and comply with all other applicable leak detection system requirements of this chapter;

(c)(1) If an owner or operator plans to close a surface impoundment in accordance with subsection (a)(1) of this section, then:

(A) the closure plan for the impoundment under section 66264.112 shall include both a plan for complying with subsection (a)(1) of this section and a contingent plan for complying with subsection (a)(2) of this section in case not all contaminated subsoils can be practicably removed at closure; and

(B) the owner or operator shall prepare a contingent postclosure plan under section 66264.118 for complying with subsection (b) of this section in case not all contaminated subsoils can be practicably removed at closure.

(2) The cost estimates calculated under sections 66264.142 and 66264.144 for closure and postclosure care of an impoundment subject to this paragraph shall include the cost of complying with the contingent closure plan and

  

the contingent postclosure plan.

(d) During the postclosure care period, if liquids leak into a leak detection system, the owner or operator shall notify the Department of the leak in writing within seven (7) days after detecting the leak.

(e) If waste is to remain in a unit after closure, the owner or operator shall comply with, and plan for compliance with the following:

(1) The unit shall be compacted before any portion of the final cover is installed.

(2) (reserved).

(3) (reserved).

(4) A foundation layer shall be provided for the compacted barrier layer of the final cover. If needed, the foundation layer shall contain herbicide sufficient to prevent vegetative growth, and shall be free of decomposable organic matter. The layer shall be compacted at a moisture content sufficient to achieve the density required to provide adequate support for the nonearthen membrane.

(5) A compacted barrier layer of clean earth shall be provided above the foundation layer, and shall be provided around the unit to a depth as low as the level at which the owner or operator has deposited waste, to prevent lateral migration of waste and gas and vapor from the waste. The layer of earth shall be wholly below the average depth of frost penetration, and shall be compacted at a moisture content sufficient to achieve a percent compaction that has been demonstrated, with the specific cover material to be used, to prevent the downward entry of water into the foundation layer for a period of at least 100 years.

(6) The earthen material shall contain herbicide sufficient to prevent growth of vegetation. The slope of the final top surface of the compacted barrier layer shall be sloped after allowance for settling and subsidence to prevent the build up of hydraulic head.

(7) the owner or operator may use nonearthen materials for the barrier layer provided it is demonstrated to the satisfaction of the Department that a barrier layer of alternative composition will equally impede movement of fluid and be as durable as a compacted earthen barrier.

(8) If hazardous waste is underlain by a liner containing a synthetic membrane, then a synthetic membrane shall be provided in the final cover above the compacted barrier layer. The membrane shall be made of material chemically resistant to the waste at the facility, whether or not contact between the membrane and the waste is anticipated, and shall have thickness and strength sufficient to withstand the stresses to which it shall be including shear forces, puncture from rocks or penetration from roots.

(9) If a synthetic membrane is used in the final cover system, the owner or operator shall provide a layer of material above the synthetic membrane of the final cover, and a layer of material below this synthetic membrane, to protect the membrane from damage.

(10) The owner or operator shall provide a water drainage layer, blanket or channel above the compacted barrier layer of the final cover to provide a path for water to exit rapidly.

(11) The owner or operator shall provide a filter layer above the water drainage layer to prevent soils from clogging the drainage layer.

(12) The owner or operator shall provide a layer of top soil of thickness sufficient to support vegetation for erosion controlled deep enough to prevent root penetration into the filter layer. The top soil shall have characteristics to protect the compacted layer against drying that would lead to cracking, to resist erosion and to support vegetation growth.

(13) Permanent disposal areas shall be graded at closure so that with allowance for settling and subsidence, the slope of the land surface above all portions of the cover, shall be sufficient to prevent ponding of water. Such areas shall be graded to drain precipitation away from the disposal area. Portions of the land surface above the cover unavoidably slopes great enough to invite erosion which cannot be readily controlled by vegetation shall be protected by gunite, riprap or other material sufficient to provide erosion control.

(14) Unless vegetation on the cover would pose a significant fire hazard unacceptable to the fire prevention authority or would interfere with a planned postclosure use of the site that is acceptable to the Department, the owner or operator shall provide conditions favorable for hearty growth of vegetation that will provide erosion control without forming roots that would penetrate the compacted earth cover, and shall estimate the cost of providing such conditions and vegetation as part of the cost of closure. Vegetation for closed disposal areas shall be selected to require minimum watering and maintenance. Plantings shall not impair the integrity of containment structures or the final cover.

(15) At and after closure, permanent disposal areas shall have drainage systems capable of transporting water from the water drainage layer away from the closed facility and capable of diverting surface runoff away from or around disposal areas, containment structures, leachate collection systems and monitoring facilities. Drainage systems shall be capable of preventing erosion of containment structures. Drainage system components themselves shall be lined or otherwise protected against erosion.

(16)(A) When closing a permanent disposal site, the owner or which the horizontal location and elevation of the cover and other containment features, monitoring facilities and drainage features can be determined throughout the entire postclosure care period. All survey work shall conform to accepted survey practices and be performed and certified by a licensed land surveyor or registered professional engineer licensed to practice surveying.

(B) The owner or operator shall submit a copy of the surveyor's notes used to establish the benchmarks described in this subsection in accordance with section 66264.116.

(17) The owner or operator shall provide in the closure plan predictions of the magnitude of the drops in elevation that will occur at various portions of the top surface of the final cover as a result of settling and subsidence. The prediction shall account for compression of material underlying the liner (or underlying the waste if there is no

liner) and compression of the liner, waste, fill and cover. The prediction of the drop in elevation due to compression shall account for immediate settlement, primary consolidation, secondary consolidation and creep, liquefaction and dynamic consolidation due to earthquake loads.

(18) If the following information has not already been submitted to the Department and if dikes and hazardous waste will remain at the site after closure, the owner or operator shall provide in the closure plan proof that the dikes have sufficient structural integrity to withstand forces to which they can be exposed during and after closure, including the following:

(A) descriptions of topography and site conditions as required by section 66270.14(b)(18);

(B) depiction of the design layout, sections and details of the impoundment and its components, including cover, dike, liner, drainage and leak detection system;

(C) a description of, and the results of, stability analyses for the following conditions:

1. foundation soil bearing failure;

2. failure in the dike slopes; and

3. build-up of hydrostatic pressure due to failure of drainage system and cover, considering the potential for piping and erosion;

(D) strength and compressibility test results pertaining to the dike material;

(E) descriptions of dike construction and postclosure maintenance procedures with schedules and specifications;

(F) descriptions of subsurface soil conditions, groundwater levels, bedrock conditions and seismic setting of the site;

(G) discussion of the occurrence or nonoccurrence of the following factors and the significance of those factors to the integrity of the dikes:

1. frost, freezing, wind, rain, temperature variations, effects of vegetation and animals and activities of humans;

2. adversely oriented joints, slickensides or fissured material, faults, seams of soft materials and weak layers;

3. potential for liquefaction during earthquakes coincident with existence of saturated conditions due to failure of drainage system and cover;

(H) a certification by a professional engineer registered in California that the dikes have sufficient structural integrity to withstand forces to which they can be exposed during and after closure, based on analyses, tests and inspections that include the following:

1. a review of all the geologic, geotechnical, geohydrologic and other pertinent design, construction and service data;

2. a review of all climatic data, and special geologic events, such as earthquakes, which occurred during the entire period the impoundment was in service;

3. a field inspection to detect signs of settlement, subsidence, cracks, scouring, erosion, slides, holes, piping, seepage, sloughing, condition of vegetation, etc.; and

4. a determination if the original design was adequate and a review of possible changes in parameters used in the original design.

(19) The owner or operator shall include in the closure plan an explanation of how the cover, construction procedures and planned postclosure care are designed to accommodate or avoid the effects of differential settlement and consolidation without loss of integrity of the cover.

(f) Before installing the compacted barrier layer of the final cover the owner or operator shall accurately establish the correlation between the desired permeability and the density at which that permeability is achieved. To accomplish this the owner or operator shall:

(1) provide a representative foundation area for a test compacted barrier layer having drainage conditions representative of the closed facility under the compacted barrier layer;

(2) install a compacted barrier layer over that test area that has the depth and materials of construction that the compacted barrier layer for the entire landfill is planned to have, and that is compacted in the manner planned for the compacted barrier layer for the entire landfill;

(3) undertake permeability tests in the test area saturated conditions that represent the maximum hydraulic could be exerted on the compacted barrier layer of the final cover. A sufficient number of tests shall be run to verify the results. A permeability test shall commence after the test apparatus has run for a time long enough to allow the required daily rate of replenishment water to maintain constant head or to follow an asymptotic or constant trend. The rate of evaporation from the test equipment used to determine permeability shall be established;

(4) undertake a sufficient number of tests in the test area to determine the average density at which permeability complying with subsection (e)(5) of this section is obtained.

(g) The owner or operator shall comply with the following when installing the compacted barrier layer of the final cover.

(1) In each day in which final cover material is compacted, the owner or operator shall establish a grid on the upper surface of each layer compacted that day and randomly conduct density tests. A sufficient number of tests shall be conducted to confirm the effectiveness and uniformity of the compaction.

(2) If the Department indicates areas where compaction tests will be needed, the owner or operator shall undertake such tests in those areas.

(3) If the average of the values of compaction from the tests is lower than the average density pursuant to subsection (f)(4) of this section, the entire layer installed on the day represented by the tests shall be removed and

 

replaced with another layer compacted so that compaction tests taken indicate a density higher than the average density determined pursuant to subsection (f)(4) of this section.

(4) An independent, qualified person registered in California as a professional engineer or certified in California as an engineering geologist shall supervise the undertaking of all tests for permeability and percent compaction, shall supervise the construction of the final cover and shall prepare a report to be submitted to the Department which bears his or her signature and the date of the signature, and describes the results of all tests and indicates whether or not the cover, as installed, complies with the requirements of this chapter.

(5) Before starting compaction of earthen material to form the compacted barrier layer of the cover, the owner or operator shall submit to the Department the results of the following determinations, on material to be used for the compacted barrier layer of the final cover:

(A) percent fines;

(B) plastic limit, liquid limit, plasticity index and shrinkage factors;

(C) soil classification;

(D) carbon content;

(E) concentration of soluble salts in soil pore water.

(h) All slopes shall be designed and constructed to minimize the potential for failure. Any slope failure occurring within the site shall be promptly stabilized and the Department and the appropriate regional board shall be notified immediately by the owner or operator of such failure and the methods taken for stabilization.

(i) Adequate facilities shall be provided to ensure for a 100 year period that no leachate shall be discharged to surface waters or groundwater, except as authorized by the hazardous waste facility permit.

(j) Hazardous waste and discarded hazardous material contained in the closed facility shall be protected from washout and erosion as the result of tides or floods having a predicted frequency of once in 100 years.

(k) An inspection and monitoring program shall be established at every closed disposal area wherein an independent, qualified engineer registered in California shall annually evaluate and document the condition of all surface improvements, drainage facilities, erosion control facilities, vegetative cover, gas control facilities and monitoring facilities. This program shall also document the presence of any water or leachate flowing from the disposal area. The engineer shall evaluate the following and the effects of the following:

(1) condition of access control (fences and gates),

(2) condition of vegetation,

(3) erosion,

(4) cracking,

(5) disturbance by cold weather,

(6) seepage,

(7) slope stability,

(8) subsidence,

(9) settlement,

(10) monitoring the leak detection system, if there is one,

(11) operation of the leachate collection and removal system,

(12) monitoring the groundwater monitoring system,

(13) condition of run-on and run-off control systems, and

(14) condition of surveyed benchmarks.

The program shall be continued by the owner or operator of the disposal area throughout the postclosure care period. A copy of the annual report containing the above-cited observations shall be filed in a timely manner with the Department and the appropriate regional board.

(*l*) [Reserved]

(m) All constructed features which will remain at permanent disposal areas containing hazardous waste material shall be able to withstand the maximum credible earthquake without significant damage to foundations, structures, waste containment features and features which control leachate, surface drainage, erosion and gas.

(n) (Reserved)

(o) If monitoring equipment or other features which are required to be operable after closure of the facility pursuant to this chapter are rendered inoperable, the owner or operator shall render it operable or replace it with operable equipment or other features.

(p) Postclosure care which the owner or operator shall provide for shall include the conducting of surveys by a licensed land surveyor, to determine the horizontal location and elevation of the cover and other containment features, monitoring facilities and drainage features, and markers installed at the site pursuant to subsection (e)(16) of this section. Such surveys shall be taken annually.

(q) The owner or operator shall reconstruct the closed facility to restore slopes and other conditions to conform to the requirements of this chapter when movement at the site has caused them not to comply with such requirements.

(r) The owner or operator shall submit annual reports to the Department describing measures undertaken at the site during the postclosure maintenance period.

NOTE: Authority cited: Sections 208, 25150, 25159, 25159.5 and 25245, Health and Safety Code; and Governor's Reorganization Plan Number 1 of 1991. Reference: Sections 25150, 25159 and 25159.5, Health and Safety Code; and 40 CFR Section 264.228.

HISTORY

1. New section filed 5-24-91; operative 7-1-91 (Register 91, No. 22).
2. Amendment of subsections (b)(4)-(5), new subsection (b)(6) and amendment of Note filed 7-19-95; operative 8-18-95 (Register 95, No. 29).

**§66264.229. Special Requirements for Ignitable or Reactive Waste.**

Ignitable or reactive waste shall not be placed in a surface impoundment unless the waste and impoundment satisfy all applicable requirements of chapter 18 of this division, and:

(a) the waste is treated, rendered, or mixed before or immediately after placement in the impoundment so that:

(1) the resulting waste, mixture, or dissolution of material no longer meets the definition of ignitable or reactive waste under sections 66261.21 or 66261.23 of this chapter; and

(2) section 66264.17(b) is complied with; or

(b) the waste is managed in such a way that it is protected from any material or conditions which may cause it to ignite or react; or

(c) the surface impoundment is used solely for emergencies.

NOTE: Authority cited: Sections 208, 25150 and 25159, Health and Safety Code. Reference: Sections 25150, 25159 and 25159.5, Health and Safety Code; 40 CFR Section 264.229.

HISTORY

1. New section filed 5-24-91; operative 7-1-91 (Register 91, No. 22).

**§66264.230. Special Requirements for Incompatible Wastes.**

Incompatible wastes, or incompatible wastes and materials, (see Appendix V of this chapter for examples) shall not be placed in the same surface impoundment, unless section 66264.17(b) is complied with.

NOTE: Authority cited: Sections 208, 25150 and 25159, Health and Safety Code. Reference: Sections 25150, 25159 and 25159.5, Health and Safety Code; 40 CFR Section 264.230.

HISTORY

1. New section filed 5-24-91; operative 7-1-91 (Register 91, No. 22).

**§66264.231. Special Requirements for Hazardous Wastes F020, F021, F022, F023, F026, and F027.**

(a) Hazardous Wastes F020, F021, F022, F023, F026, and F027 shall not be placed in a surface impoundment unless the owner or operator operates the surface impoundment in accordance with a management plan for these wastes that is approved by the Department pursuant to the standards set out in this subsection, and in accord with all other applicable requirements of this chapter. The factors to be considered are:

(1) the volume, physical, and chemical characteristics of the wastes, including their potential to migrate through soil or to volatilize or escape into the atmosphere;

(2) the attenuative properties of underlying and surrounding soils or other materials;

(3) the mobilizing properties of other materials co-disposed with these wastes; and

(4) the effectiveness of additional treatment, design, or monitoring techniques.

(b) The Department shall impose additional design, operating, and monitoring requirements for surface impoundments managing hazardous wastes F020, F021, F022, F023, F026, and F027 if necessary to reduce the possibility of migration of these wastes to ground water, surface water, or air so as to protect human health and the environment.

NOTE: Authority cited: Sections 208, 25150 and 25159, Health and Safety Code. Reference: Sections 25150, 25159 and 25159.5, Health and Safety Code; 40 CFR Section 264.231.

HISTORY

1. New section filed 5-24-91; operative 7-1-91 (Register 91, No. 22).

**§66264.232. Air Emission Standards.**

The owner or operator shall manage all hazardous waste placed in a surface impoundment in accordance with the applicable requirements of Articles 28 and 28.5 this Chapter.

NOTE: Sections 25150, 25159, 25159.5, 25245 and 58012, Health and Safety Code. Reference: Sections 25150, 25159 and 25159.5, Health and Safety Code; and 40 CFR Section 264.232.

HISTORY

1. Change without regulatory effect adding new section filed 6-11-99 pursuant to Health and Safety Code section 25159.1 (Register 99, No. 24).

  